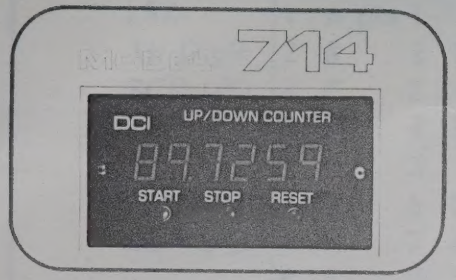
# MODEL 714

# TECHNICAL DATA

Rev B August 1983

DCI INC.
P.O. Box 215
14812 W. 117th Street
Olathe, Kansas 66061
(913) 782-5672




# BI-DIRECTIONAL COUNTER

- Through zero counting and indication
- Programmable decimal points
- Optional quadrature counting input: X1 X2 or X4
- Direct replacement for ERC/ITC Series 2310 counters
- Four or six big (.56") LED digits of display
- Optional three state TTL compatible BCD outputs
- Front panel and remote control inputs for start, stop, and reset
- Remotely presettable to a positive or negative number
- CMOS circuitry for high noise immunity and low power consumption
- Schmitt trigger input circuitry for all TTL inputs
- All aluminum case with attractive black and silver bezel
- Gold plated I/O contacts
- 100Khz count rate

Designed for industrial users the Model 714 bi-directional counter has all the features the true professional demands in a solid state counter. Schmitt trigger counting inputs, large easily read LED display, heavy duty construction, and gold plated I/O contacts. The standard unit counts from a variety of count configurations including single count source with direction select line, dual count source with one input being the up count and the other the down, and optional quadrature count input configuration available. Various signal levels and types can be counted, from as low as a 100 millivolt zero crossing sine wave up to 115 volts, and form "C" or form "A" contact closure. Optional three state BCD outputs allow paralleling of other BCD data on the same lines to simplify external wiring. Presetting is done on the BCD input/output lines. BCD outputs go to a high impedance state when preset command is received. The preset point can be a positive or negative number and unit will count up or down from the preset point. Through zero direction sensing and indication is automatic, i.e., unit counts down to zero with a positive sign and at zero switches to a negative sign and starts counting up. When counting up through zero from a negative direction the negative LED goes out when passing through zero and the unit starts counting up with positive indication.

MODEL 714 SPECIFICATIONS

**Accuracy:**
± 1 count @ 0 to 50 degrees Celsius

**Display:**
4 or 6 digits, .56" high-efficiency red LED 9.9.9.9.9.9, red LED dot for negative polarity and overrange. Decimal points programmable via solder pads behind front panel lens.

**Front Panel Controls:**
Three pushbutton switches, one each for start, stop, and reset. If ordered as presettable unit the reset button becomes a preset button.

**Inputs:**
Remote start/stop/reset: Requires closure to logic common or TTL logic zero. Input loading 1 LPTTL load. Stop signal overrides start and must be activated prior to reset command.

Latch: (01 option only) Requires TTL logic zero or closure to common. BCD data is held as long as latch line is held low. Does not affect count accumulation. Input loading 1 LPTTL load.

Store display: Requires TTL logic one or closure to logic 5 volts. Display will be held as long as store line is held high and will update when store is allowed to go low again. Does not affect count accumulation. Input loading 1 LPTTL load.

Parallel BCD: For presetting, must be three state or diode isolated. Input loading 1 LPTTL load.

Three state control: (01 option only) Requires TTL logic zero or closure to logic common. Forces all BCD outputs to a high impedance state. Does not affect data stored in latches. Input loading 1 LPTTL load.

Sine wave/pulse count input: (option -08). Minimum signal 100mvRMS, DC to 10khz. 500 mvRMS, DC to 100khz. Maximum signal 115VAC without damage to circuitry. Input impedance 100kohm. Threshold adjustable from the front panel with a small screwdriver.

TTL level inputs: Schmitt trigger with no limit on rise or fall time of input pulse. Maximum count rate 100khz. Input loading 1 LPTTL load.

Contact closure inputs: Accepts form "C" closure input standard but can be modified to accept Form "A" closures by adding filter capacitors on N.O. count input to limit count rate to maximum rate expected. For instance for a count rate of 20hz a 1uf capacitor is required between the N.O. input and logic common with the N.C. input tied to logic common. Can be factory installed.

Polarity preset: Requires logic one for positive and logic zero for negative. Can only be preset when unit is programmed for preset operation and reset is activated. Input loading 1 LPTTL load.

**Input Power:**

| | |
|---|---|
| 115VAC, 50-400 hz | 8 watts maximum |
| 230VAC, 50-400 hz | 8 watts maximum (optional) |
| 5VDC @ 500 ma maximum | (optional) |
| 10-15VDC @ 500 ma maximum | (optional) |
| 10-30VDC @ 500 ma maximum | (optional) |

**Operating Temperature Range:** Zero to fifty degrees Celsius.

**I/O Method:** Card edge connectors with solder tabs.

**Case Size:** "A"

**Outputs**

BCD: Three state + 8421 TTL compatible. Fan out of 4 TTL loads. (Optional)

Carry output: Normally high goes to logic zero during count of 1,000000 when counting up. Fan out of 1 LPTTL load.

Borrow output: Normally high goes to logic zero during count of 000000 when counting down. Fan out of 1 LPTTL load.

Reset output: Normally low goes high when reset is activated. Fan out of 3 TTL loads.

Overrange output: Normally low, goes high for overrange. Fan out of 1 LPTTL load.

Power interrupt: Normally a logic level one, goes to logic zero after return of power following power interruption. Fan out of 1 LPTTL load.

Polarity output: TTL logic one for positive and logic zero for negative. Fan out of 1 LPTTL load.

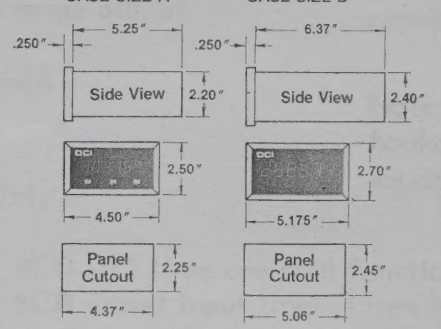
OPTIONS

| | | | |
|---|---|---|---|
| * 01 | Three state + 8421 TTL compatible buffered, latchable BCD outputs. Will drive up to 4 TTL loads. | (4 digits)<br>(6 digits) | $25.00<br>$35.00 |
| * 02 | Add two digits to left of display to make a six digit display | | $25.00 |
| * 03 | Quadrature input counting logic. Specify X1, X2 or X4. | | $50.00 |
| * 04 | Presettable operation. Unit is configured such that when reset is activated display will go to number input on BCD lines. All BCD inputs must be programmed for unit to preset properly. | | $ 5.00 |
| * 05 | 5VDC input power | | $ 5.00 |
| * 07 | Z Reference input. Compatible with BEI encoders. | | $35.00 |
| * 08 | Input amplifiers for sine wave/pulse input signals. Threshold is front panel adjustable | | $25.00 |
| * 10 | Remove front panel switches | | $ 3.00 |
| * 12 | 10-15VDC input power | | $15.00 |
| * 18 | Reset switch only | | $ 3.00 |
| * 22 | 230VAC input power | | $10.00 |
| * 24 | 10-30VDC input power | | $50.00 |
| * 25 | Logo and/or nomenclature change (Special artwork to be supplied by customer) | One time charge<br>Plus per lens | $45.00<br>$ 5.00 |
| * 26 | No Logo | | $ 3.00 |
| * 28 | Blank lens | | $ 3.00 |
| * 29 | Heavy duty I/O connectors | | $ 5.00 |
| * 36 | "COUNTER" legend | | $ 5.00 |
| * 37 | "Up/Down Counter" legend | | $ 5.00 |
| * 38 | "Degrees" legend | | $ 5.00 |


# DCI INC.
# P.O. Box 215
# Olathe, Kansas 66061

[913] 782-5672


## Dimensions




## PRICES

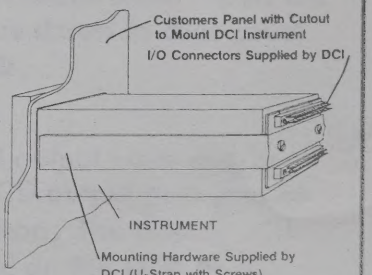
FOB Olathe, Kansas. Terms: Net 30 days. DCI reserves the right to change prices without notice. All orders subject to acceptance.

## WARRANTY

DCI Inc. warrants instruments of its manufacture to be free from defects in material and workmanship for one year (12 months) from the date of original purchase. Any instrument found to be defective during this period may be returned, transportation prepaid, to the factory for repair or, at our option, replacement without charge.

This warranty does not apply to any of our products which have been repaired or altered by unauthorized persons or which have had the serial number altered, effaced or removed. This warranty is in lieu of all other warranties whether expressed or implied.

## Mounting


Customers Panel with Cutout to Mount DCI Instrument
I/O Connectors Supplied by DCI
INSTRUMENT
Mounting Hardware Supplied by DCI (U-Strap with Screws)

Note: Use Corner Screw of Case for Case Ground

Represented by:

| DATE | SYM | REVISION RECORD | DR. | CK. |
|---|---|---|---|---|
| | | | | |
| | | | | |
| | | | | |

# CONNECTOR TERMINAL DESIGNATION

## J1

| | | | pin | | |
|---|---|---|---|---|---|
| LSD | 1 | A | 1 | 1 | |
| 1st Digit BCD I/O | 2 | B | 2 | 2 | 3 Digit BCD I/O |
| | 4 | C | 3 | 4 | |
| | 8 | D | 4 | 8 | |
| | 1 | E | 5 | 1 | |
| 2nd Digit BCD I/O | 2 | F | 6 | 2 | 4th Digit BCD I/O |
| | 4 | H | 7 | 4 | |
| | 8 | J | 8 | 8 | |
| | 1 | K | 9 | 1 | MSD |
| 5th Digit BCD I/O | 2 | L | 10 | 2 | 6th Digit BCD I/O |
| | 4 | M | 11 | 4 | |
| | 8 | N | 12 | 8 | |
| Preset | | P | 13 | | Borrow out |
| *Three State | | R | 14 | | Carry out |
| Store Display | | S | 15 | | LLatch BCD* |

## J2

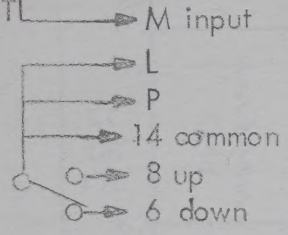
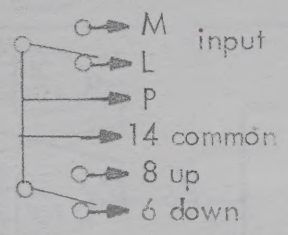
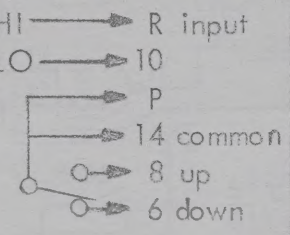
| | | | | |
|---|---|---|---|---|
| Reset Output | A | pin 1 | | Remote Start |
| Polarity | B | 2 | | Remote Stop |
| N/C | C | 3 | | Remote Reset |
| A Contact Closure NO | D | 4 | | N/C |
| A Contact Closure NC | E | 5 | | Power Interrupt |
| Pol. Preset | F | 6 | | Down Control (Z input - Opt. 7) |
| N/C | H | 7 | | 115VAC 60Hz Power |
| N/C | J | 8 | | Up Control |
| N/C | K | 9 | | 115VAC 60Hz Power |
| B Contact Closure NO | L | 10 | | Common |
| B Contact Closure NC | M | 11 | | Common |
| Program A | N | 12 | | Overrange output |
| Program B | P | 13 | | N/C |
| **Voltage in A | R | 14 | | Common |
| **Voltage in B | S | 15 | | +5V |

* Buffered Option -01 Only ** Voltage Input Option -06 Only

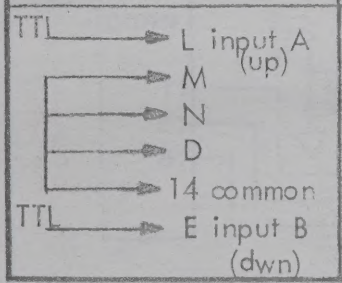
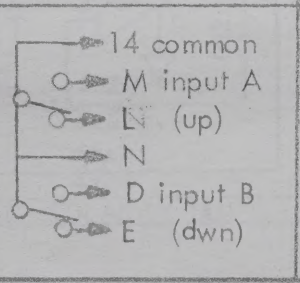
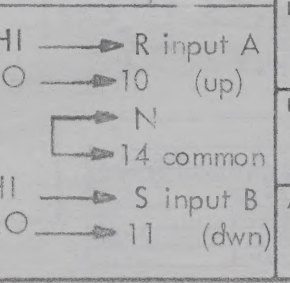
Decimal points are progamable by removing the front panel lens and solder bridging the desired "D" number to the main buss line. The "D" numbers are located on the display board just below the decimal point LED you wish to light. For example D1=999999., D2=99999.9 etc.

Note: Quadrature count inputs are hooked up as shown in dual count source block.

## SINGLE COUNT SOURCE Connector J2

| TTL INPUT | CONTACT CLOSURE | VOLTAGE INPUT** |
|---|---|---|
|   |   |   |

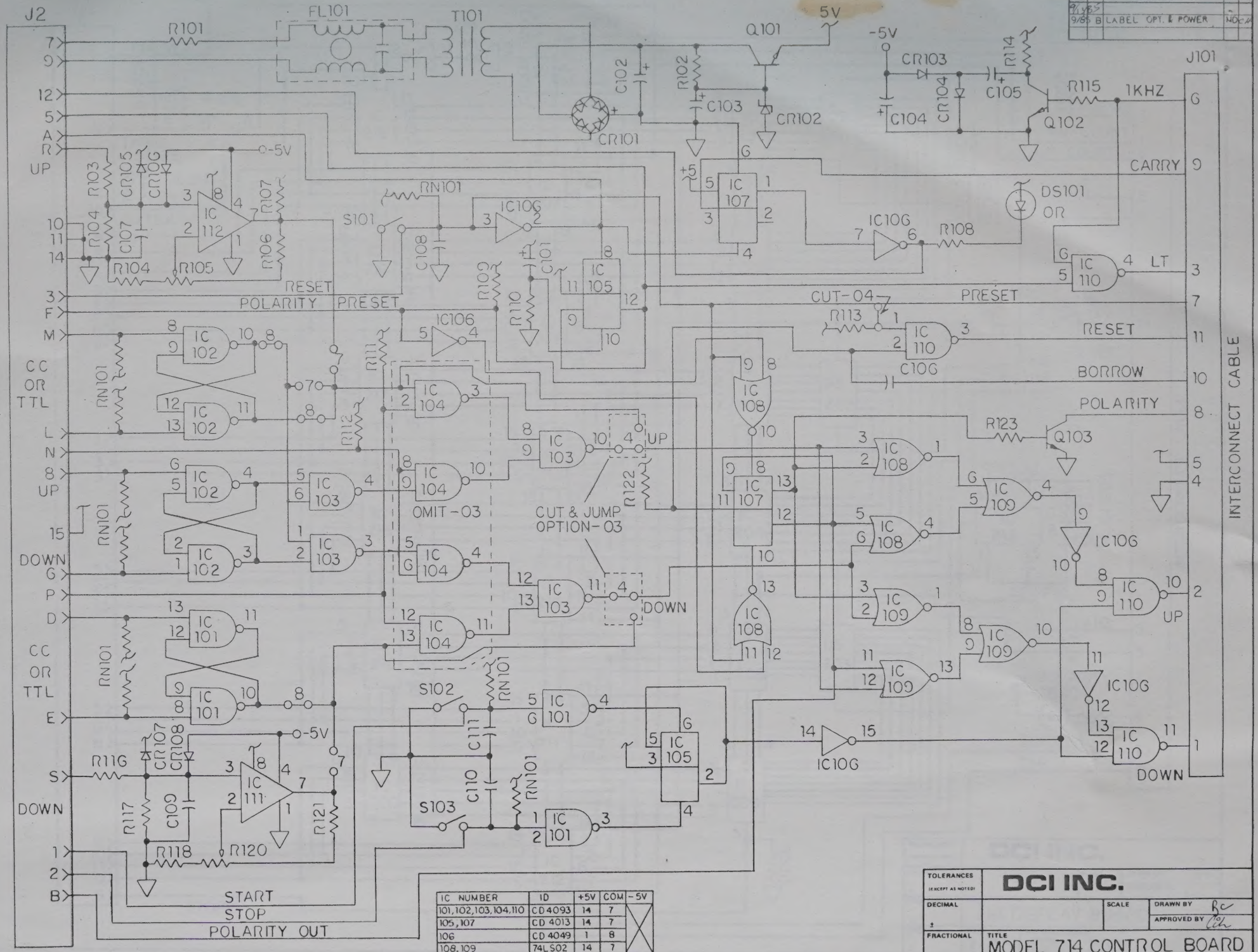
## DUAL COUNT SOURCE Connector J2

| TTL INPUT | CONTACT CLOSURE | VOLTAGE INPUT** |
|---|---|---|
|   |   |   |

BCD I/O lines are dual function BCD output lines and/or BCD preset input lines. Lines have BCD output data present until preset line is tied to logic common. The display will then preset to the BCD data presented on the BCD lines. To input BCD data for preseting, data must come from diode isolated BCD switches using the common to enable switches during preset only, or by using logic gates with three-state control to keep outputs at a high impeadence state until presetting.

| | | | |
|---|---|---|---|
| TOLERANCES (EXCEPT AS NOTED) | | | |
| DECIMAL ± | | SCALE | DRAWN BY Coh |
| | | | APPROVED BY BC |
| FRACTIONAL ± | TITLE SERIES 700 TERMINAL DESIGNATION | | |
| ANGULAR ± | DATE 1-13-81 | DRAWING NUMBER 0700-3000 | |

GAE DRAFTRACE 250

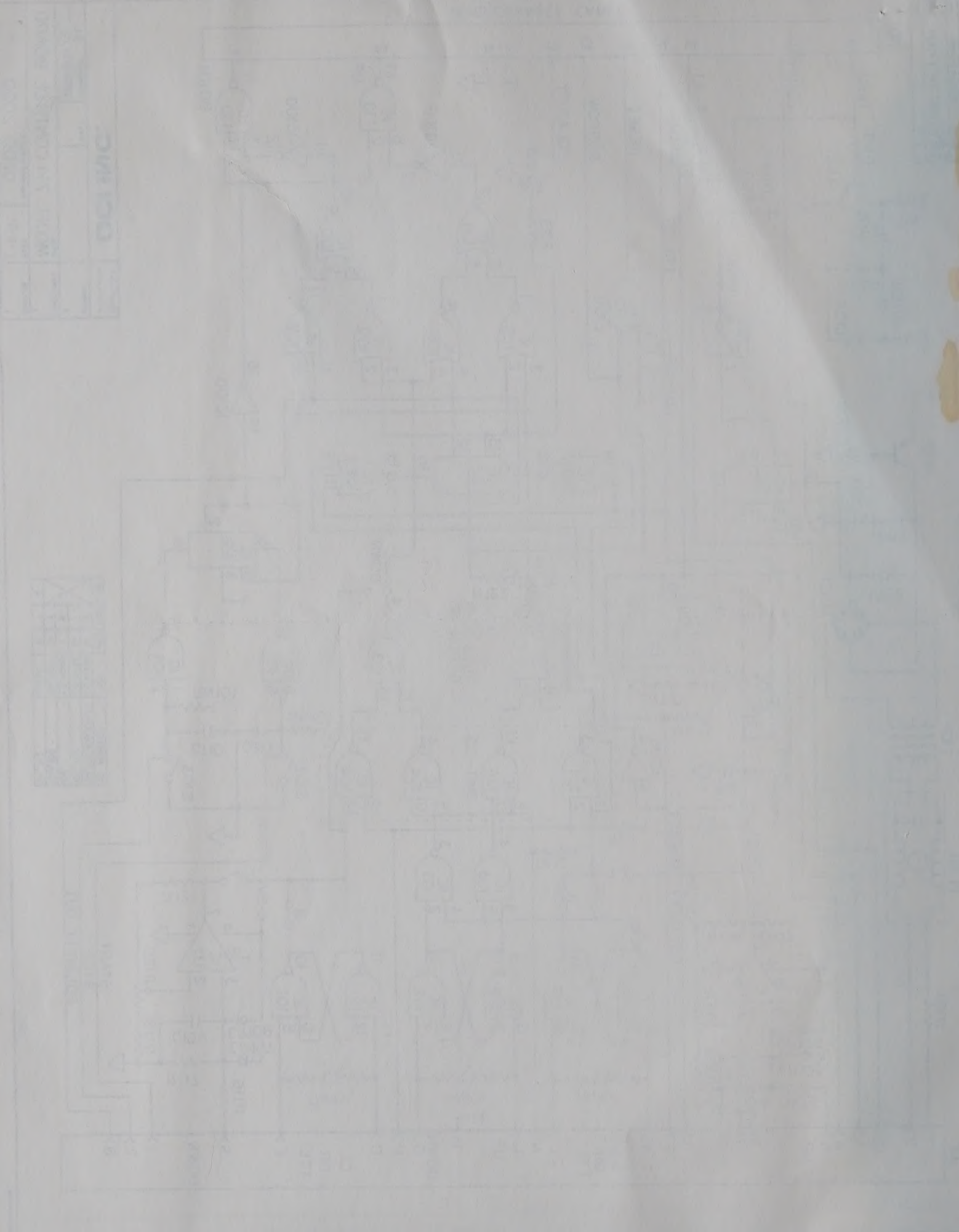


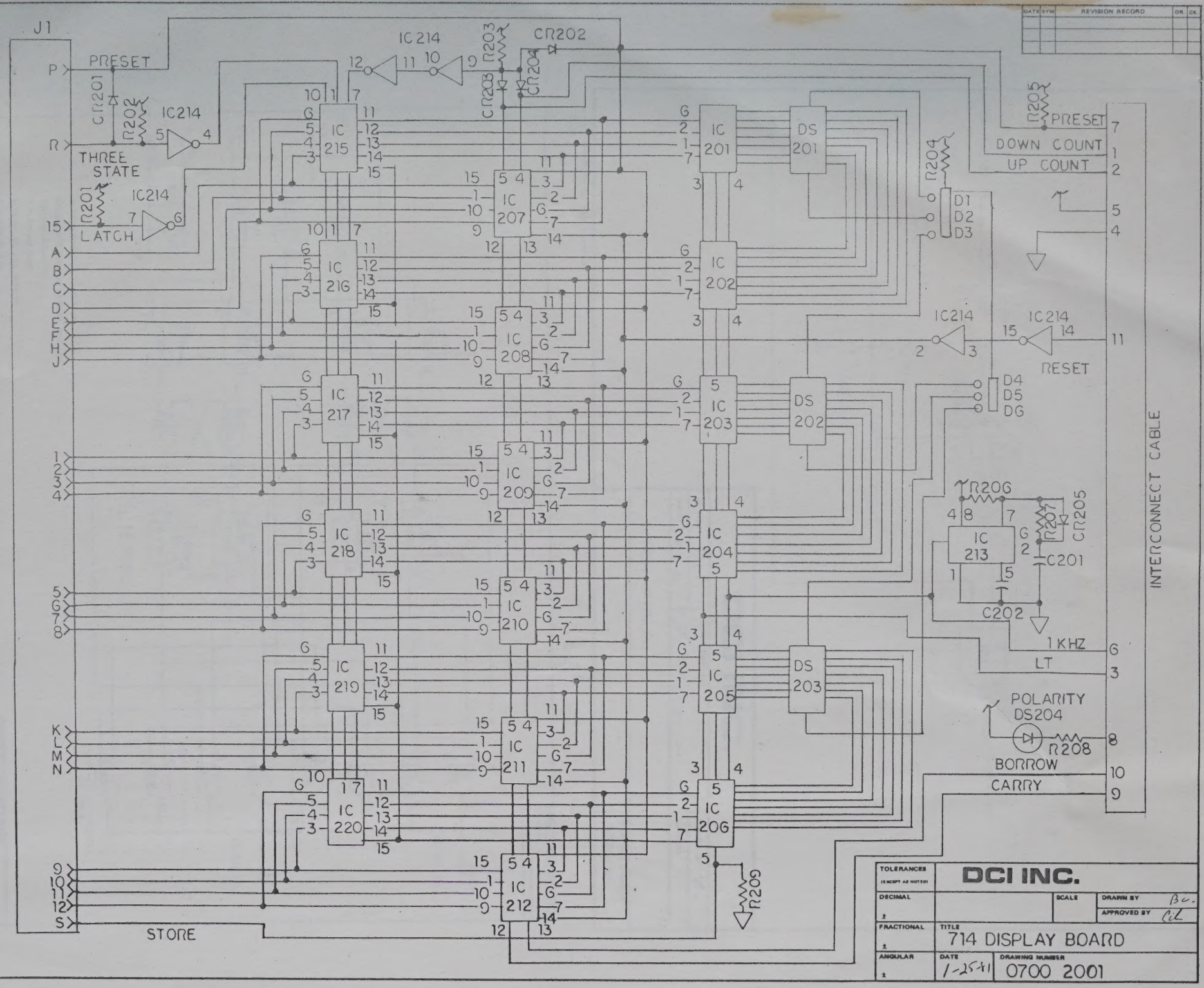

| IC NUMBER | ID | +5V | COM | -5V |
|---|---|---|---|---|
| 101,102,103,104,110 | CD 4093 | 14 | 7 | |
| 105,107 | CD 4013 | 14 | 7 | |
| 106 | CD 4049 | 1 | 8 | |
| 108,109 | 74LS02 | 14 | 7 | |
| 111,112 | LM311 | 8 | 1 | 4 |

| REVISION RECORD | | | |
|---|---|---|---|
| DATE | SYM | | DR. CK. |
| 9/16/83 | | | |
| 9/85 | B | LABEL OPT. & POWER | NDCA |

| | | | |
|---|---|---|---|
| TOLERANCES (EXCEPT AS NOTED) | DCI INC. | | |
| DECIMAL ± | | SCALE | DRAWN BY RC |
| | | | APPROVED BY |
| FRACTIONAL ± | TITLE MODEL 714 CONTROL BOARD | | |
| ANGULAR ± | DATE 1-25-84 | DRAWING NUMBER 0700 2000 | |

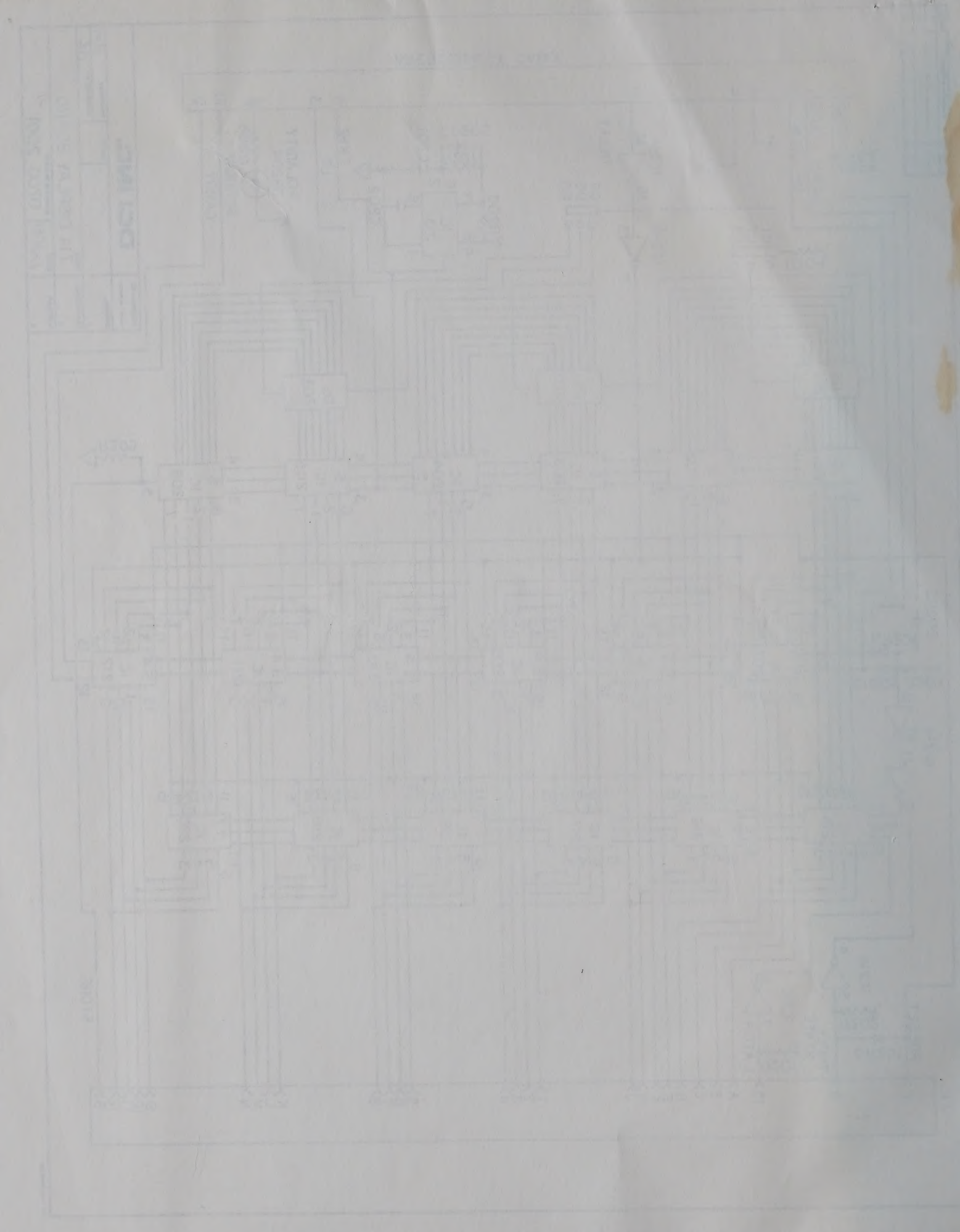
QAF DRAFTRACE 250

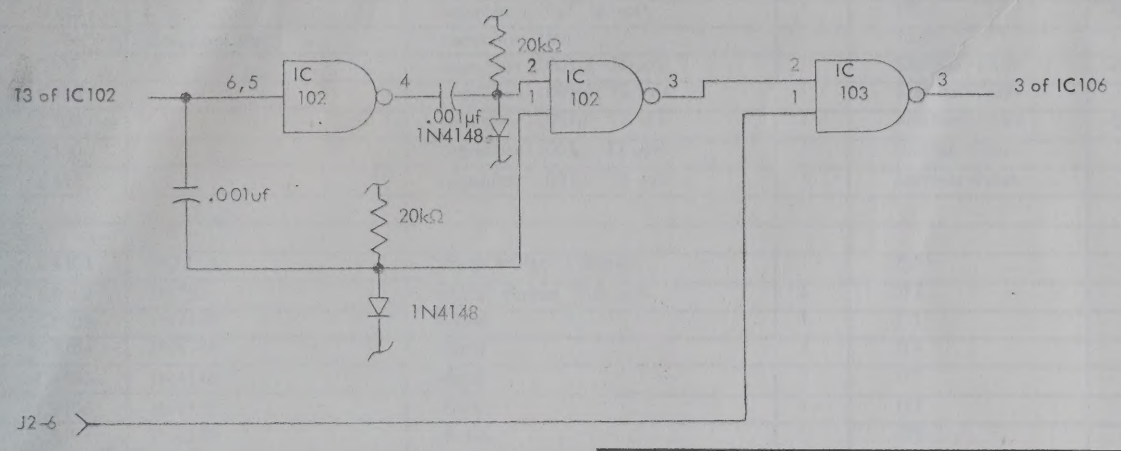





| DATE | SYM | REVISION RECORD | DR | CK |
|---|---|---|---|---|
| | | | | |

| | | | |
|---|---|---|---|
| TOLERANCES (EXCEPT AS NOTED) | DCI INC. | | |
| DECIMAL ± | | SCALE | DRAWN BY Bc. |
| | | | APPROVED BY RL |
| FRACTIONAL ± | TITLE 714 DISPLAY BOARD | | |
| ANGULAR ± | DATE 1-25-71 | DRAWING NUMBER 0700 2001 | |

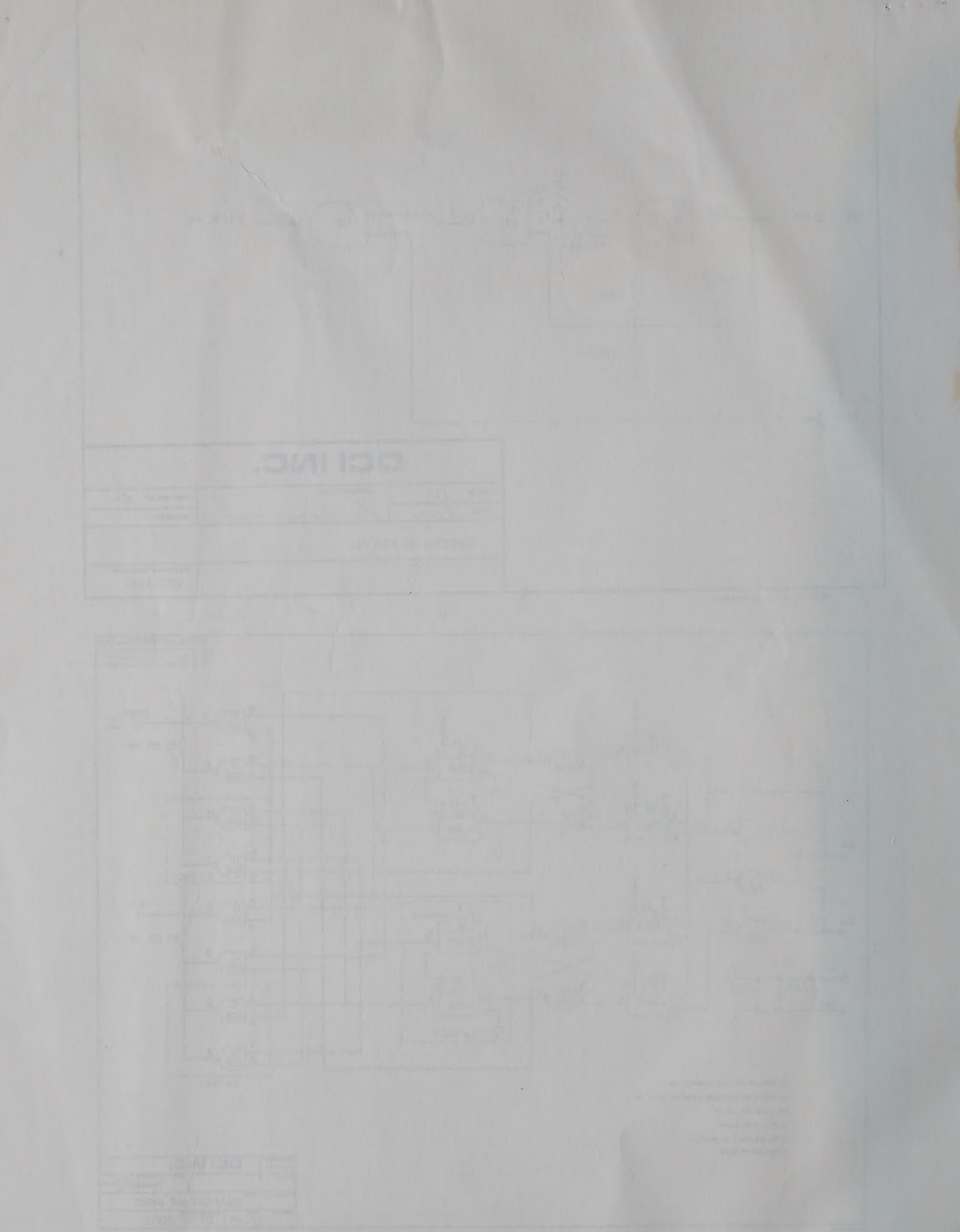





| DCI INC. | | |
|---|---|---|
| SCALE: 1:1 | APPROVED BY: | DRAWN BY BC |
| DATE: 8-22 | | REVISED |
| OPTION -07 FOR 714 | | |
| | | DRAWING NUMBER 0700-1100 |

9½ X 11 PRINTED ON NO. 1000H CLEARPRINT

| REVISION RECORD | | |



PART NUMBER Model 714

**DCI INC.**

NOMENCLATURE Bi-Directional counter control board PARTS LIST REVISION DATE 2-11-81

PAGE 1 of 3 APPROVED by

| Designation | Part Number | Description | Qty. | Supplier | Notes |
|---|---|---|---|---|---|
| C101 | | capacitor 1µf 50 volt | 1 | TAW | |
| C102 | | capacitor 1000µf 10volt | 1 | TAW | |
| C103 | | capacitor 220µf 10 volt | 1 | TAW | optional |
| C104 | | capacitor 10µf 16 volt | 1 | TAW | -06 option only |
| C105 | | capacitor 10µf 16 volt | 1 | TAW | -06 option only |
| C106 | CMO5 100pf | capacitor 100pf | 1 | TAW | |
| C107 | | capacitor .001µf 12 volt | 1 | Stettner-Trush | -06 option only |
| C108 | | capacitor .001µf 12 volt | 1 | Stettner-Trush | |
| C109 | | capacitor .001µf 12 volt | 1 | Stettner-Trush | -06 option only |
| C110 | | capacitor .001µf 12 volt | 1 | Stettner-Trush | |
| C111 | | capacitor .001µf 12 volt | 1 | Stettner-Trush | |
| | | | | | |
| CR101 | WO4 | diode bridge 1 ampere | 1 | GI | |
| CR102 | 1N752 | diode zenner 5.6 volt | 1 | ITT | |
| CR103 | 1N4148 | diode | 1 | ITT | |
| CR104 | 1N4148 | diode | 1 | ITT | |
| CR105 | 1N4148 | diode | 1 | ITT | |
| CR106 | 1N4148 | diode | 1 | ITT | |
| CR107 | 1N4148 | diode | 1 | ITT | |
| CR108 | 1N4148 | diode | 1 | ITT | |
| | | | | | |
| DS101 | MV50 | LED | 1 | GI | |
| | | | | | |
| FL101 | FL101 | AC line filter | 1 | DCI | |
| | | | | | |

form X150

PART NUMBER Model 714

**DCI INC.**

NOMENCLATURE Bi-Directional counter control board PARTS LIST REVISION DATE 2-11-81

PAGE 2 of 3 APPROVED by

| Designation | Part Number | Description | Qty. | Supplier | Notes |
|---|---|---|---|---|---|
| J101 | 240AG39D | socket | 1 | August | |
| J2 | EZM15DSEH | 30 pin connector | 1 | Sullins | |
| | | | | | |
| IC101 | CD4093 | quad NAND gate | 1 | RCA | |
| IC102 | CD4093 | quad NAND gate | 1 | RCA | |
| IC103 | CD4093 | quad NAND gate | 1 | RCA | |
| IC104 | CD4093 | quad NAND gate | 1 | RCA | |
| IC105 | CD4013 | dual flip flop | 1 | RCA | |
| IC106 | CD4049 | hex inverter | 1 | RCA | |
| IC107 | CD4013 | dual flip flop | 1 | RCA | |
| IC108 | 74LS02 | quad NOR gate | 1 | TI | |
| IC109 | 74LS02 | quad NOR gate | 1 | TI | |
| IC110 | CD4093 | quad NAND gate | 1 | RCA | |
| IC111 | LM311 | comparator | 1 | National | option -06 only |
| IC112 | LM311 | comparator | 1 | National | option -06 only |
| | | | | | |
| Q101 | 2N6130 | power transistor | 1 | National | |
| Q102 | MPSA13 | darlington transistor | 1 | GE | option -06 only |
| Q103 | MPSA13 | darlington transistor | 1 | GE | |
| | | | | | |
| R101 | BB-5105 | 51Ω 1/8W | 1 | Allen Bradley | |
| R102 | RG07GF510J | 51Ω 1/4W | 1 | IRC | |
| R103 | RG07GF104J | 100KΩ 1/4W | 1 | IRC | option -06 only |
| R104 | RG07GF106J | 1MΩ 1/4W | 1 | IRC | option -06 only |
| R105 | 3006P-1-103 | pot. 10KΩ | 1 | Bourns | option -06 only |
| R106 | RG07GF473J | 47KΩ 1/4W | 1 | IRC | option -06 only |
| R107 | RG07GF103J | 10KΩ 1/4W | 1 | IRC | option -06 only |

form X150

PART NUMBER Model 714

**DCI INC.**

NOMENCLATURE Bi-Directional counter control Board PARTS LIST REVISION DATE 2-11-81

PAGE 3 of 3 APPROVED by Ch

| Designation | Part Number | Description | Qty. | Supplier | Notes |
|---|---|---|---|---|---|
| R108 | RG07GF241J | 220Ω 1/4W | 1 | IRC | |
| R109 | RG07GF203J | 20KΩ 1/4W | 1 | IRC | |
| R110 | RG07GF473J | 47KΩ 1/4W | 1 | IRC | |
| R111-113 | RG07GF203J | 20KΩ 1/4W | 3 | IRC | |
| R114 | RG07GF102J | 1KΩ 1/4W | 1 | IRC | option -06 only |
| R115 | RG07GF203J | 20KΩ 1/4W | 1 | IRC | option-06 only |
| R116 | RG07GF104J | 100KΩ 1/4W | 1 | IRC | option -06 only |
| R117 | RG07GF106J | 1M 1/4W | 1 | IRC | option -06 only |
| R118,119 | RG07GF100J | 100Ω 1/4W | 2 | IRC | option -06 only |
| R120 | 3006-P-103 | pot. 10KΩ | 1 | Bourns | option -06 only |
| R121 | RG07GF473J | 47KΩ 1/4W | 1 | IRC | option -06 only |
| R122 | RG07GF203J | 20KΩ 1/4W | 1 | IRC | |
| RN101 | 4310R-10-1-223 | 22KΩ resistor network | 1 | Bourns | |
| S101-103 | PB1-2AN | push button switches | 3 | American Switch | |
| T101 | 73C-3 | Transformer | 1 | Dietz Design | |
| | 0700-0001 | PC board | 1 | DCI Inc. | |

form X150

PART NUMBER Model 714

**DCI INC.**

NOMENCLATURE Bi-Directional counter display board PARTS LIST REVISION DATE 2-11-81

PAGE 1 of 1 APPROVED by Ch

| Designation | Part Number | Description | Qty. | Supplier | Notes |
|---|---|---|---|---|---|
| C201 | | .01μf, Capicator, 25V | 1 | TAW | |
| C202 | | .1μf, Capacitor, 12V | 1 | TAW | |
| CR201-205 | 1N4148 | diode | 5 | ITT | |
| DS201-203 | Man6640 | dual 7 segment LED | 3 | GI | 203, option -02 only |
| DS204 | MV-50 | LED | 1 | GI | |
| IC201-206 | CD4511 | BCD to 7segment decoder | 6 | RCA | 205,206 option-02 only |
| IC207-212 | CD40192 | up/down counter | 6 | RCA | 211,212 option-02 only |
| IC213 | NE555 | Timer | 1 | Signetics | |
| IC214 | CD4049 | hex inverter | 1 | RCA | |
| IC215-220 | 74LS173 | quad Tri-State latches | 6 | TI | option-01 only |
| J1 | EZM15DREH | 30 pin connector | 1 | Sullins | |
| R201-203 | | 20KΩ 1/4W Resistor | 3 | IRC | |
| R204,208 | | 150Ω " " | 2 | IRC | |
| R205,206 | | 10KΩ " " | 2 | IRC | |
| R207 | | 47KΩ " " | 1 | IRC | |
| R209 | | 20KΩ " " | 1 | IRC | |
| J201 | 3-86942-7 | 11 pin flex cable | 1 | Amp | |
| | 0700-0002 | PC board | 1 | DCI Inc. | |

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